



FIG. 1.—Rainfall régimes.

Ocean; viz, 60-50 inches on the Atlantic coast decrease to 40-30 in Mississippi and Missouri (St. Louis), to 20-15 in Colorado (Denver), to 10-5 in Arizona. Then it increases to 50-60 on the coast of California, and reaches 100 inches in the district of Juan de Luca by Neah Bay. But what the chart does not show is the influence, so important in Europe, of the ocean on the distribution of rain.

On the eastern coast, by the Atlantic, the greatest rainfall takes place in the spring and summer, while on the western coast, by the Pacific, the principal rainfall occurs in the fall and winter, with absolutely no rain in the summer, as in San Francisco.

It is also a fact that the Atlantic coast from New York to the southern end of Florida has the same regimen as the interior, which is the reverse of the conditions in Europe, where the coast districts always have more rain, as may be seen on my chart of France or on my chart of western Europe.

You will note on the accompanying map the continental normal régime, (I), the marine régime (IV), and the intermediate and semimarine régimes (VII, VIII, and VI). There are also other régimes at some isolated stations, but on account of the smallness of the map I can not indicate them. You will note that régime I (normal) occupies a large surface, both in the interior and on the Atlantic coast, that the modifications VIII and VI seem to be influenced by the Gulf of Mexico and the Pacific, and that the entire régime IV and modification VII are influenced by the Pacific Ocean.

For forty years I have been of the opinion that these régimes are of great importance to agriculture and industry, and that it would be useful to indicate the different zones of annual rainfall on the rainfall charts.

TROPICAL STORM OF OCTOBER 10 TO 20, 1900.

Mr. Paul DeGraw, Assistant Observer at Havana, Cuba, forwards a record of daily weather conditions at Havana during the tropical storm that apparently was central over or a little south of central Cuba on October 15, and remained stationary over southern Florida from the morning of the 17th until the morning of the 19th. Mr. DeGraw's report may be briefly summarized by saying that the wind was generally fresh to brisk from the northeast from October 10 to 15, reaching a maximum of 36 miles per hour on the 11th. The barometer fell slowly and continuously from the 8th to 3 a. m. on the 16th, when it reached 29.58 inches, and at 2:30 p. m. on that date the wind backed to northerly and diminished in force.

Cloudy weather with frequent light showers prevailed from the 11th to the 16th, followed by clear weather on the 17th, but showers again occurred from the 18th to the 21st.

The barometer rose on the 16th, remaining nearly stationary until the 19th, when it fell slowly, recording 29.58 at 6 p. m., and 29.57 at 4 a. m. of the 20th, beginning to rise again in the evening of the 20th, and rising rapidly throughout the following day. The winds on the 17th and 18th were light and variable, but gradually backing to the southwest and south, increasing in force from the 19th to the 21st, and gradually veering to northwest by the afternoon of the 20th. A moderate sea swell, observed for the first time on the 14th, increased gradually in force.

Mr. DeGraw incloses two reports from the neighborhood of Cienfuegos and also the following translation from the log of the steamship *Buenos Aires*, Transatlantica Espanola Line, which arrived in Havana October 21, seven days and eleven hours from New York:

At 6 p. m. of the 16th we experienced, in the mouth of the Bahama Channel (Florida Strait), strong winds from the northeast, in which direction showers completely shut off the view. Inasmuch as we were unable to discern the lights of Jupiter, we turned our prow to the wind and lessened speed. On the morning of the 17th we discovered a cyclone to the south, and, supposing that its path would have to be the coast of Florida, we continued to face the wind and maintained the low speed of twenty revolutions.

On the morning of the 18th the characteristics of the cyclone were more marked and the wind veered to the east, with gusts of hurricane strength.

At nightfall we again intended to enter the channel, but at midnight the wind became so bad that we were forced to desist.

On the morning of the 19th southeast winds prevailed; we changed the vessel's course, and began to sail in this direction. That night the rain was so heavy and the wind so strong that it became necessary to moderate the speed of the engines to the lowest possible velocity.

We continued in this way until the morning of the 20th, during which day, the weather being somewhat cleared and the winds veering to the southwest, we recognized Cayo Sal, and headed for Havana.

Reports from Mr. L. F. Hughes at Central Soledad and from

Mr. P. M. Beal at Colonia Guabairo, estates distant respectively eight and ten miles from Cienfuegos, show a sequence of weather changes in general similar to that at Havana, but the lowest barometer readings were recorded on the afternoon or evening of the 15th, and the wind backed to southwest by the morning of the 16th. The precipitation is given in the following table:

Precipitation, in inches, October 10-22.

Date.	Cienfuegos.	Central Soledad.	Colonia Guabairo.	Havana.
October 10	T.			.33
October 11	0.42	0.78	0.40	0.45
October 12	0.71	0.45	0.37	0.15
October 13	0.32	1.02	0.55	0
October 14	0.20	0.03	0.03	0.56
October 15	T.	0.08	0.11	0.30
October 16	1.39	2.20	3.13	0.74
October 17	2.19	0.76	1.10	0
October 18	1.83	1.50	2.72	0.67
October 19	0.96	1.47		0.60
October 20	0.14			0.38
October 21	0.99			0.02
October 22	0.36			0

The daily precipitation at Cienfuegos and Havana is the total for the twenty-four hours ending at 8 p. m. The hour at which precipitation was measured at the other places is not stated, and the four columns may not be strictly comparable as regards time. Mr. Hughes states that there are several rain gages on different parts of the estate, and that all of them measured different quantities each day, showing that the rain fell in squalls of unequal intensity. On October 21 a shower at an out station measured 3.35 inches in less than an hour.

The Havana Post of October 22 records the experience of the Peninsular & Occidental steamship *Martinique*, which left Havana for Miami, Fla., at 4 p. m. on the 14th and arrived at Key West thirty-three hours later, being delayed in crossing the Gulf by the storm. Between Key West and Miami the ship encountered extremely high winds and seas, and put into Hawk's Channel for shelter, where, on the 16th, the wind was estimated at 50 miles per hour, increasing to 75 miles. "Every room that had a window open was filled with dozens of little birds, while the deck was littered with dead ones that struck the houses and masts in their flight through the darkness, pushed ahead by the fierce storm."—*F. O. S.*

THE DECHEVRENS ANEMOMETER. COLD WAVES.

In the MONTHLY WEATHER REVIEW for March of this year Rev. Marc Dechevrens describes his anemometer for the measurement of the vertical component of the wind, and notes by Professors Abbe and Marvin are added. In a recent letter Father Dechevrens replies to these comments and also refers briefly to his theory of cold waves. A translation of some portions of the letter follows:

THE WEATEER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and VI.

The mean pressure for the month was high over the region from Kansas and the Indian Territory northeastward to the Atlantic Ocean in the latitude of New Jersey, and eastward to east-central North Carolina, with the crest over the mountain regions of West Virginia, southwestern Virginia, and eastern Kentucky. Another area of high mean pressure occurred over portions of the northern and middle Plateau regions.

The mean pressure was low over the Florida Peninsula, and portions of the southern Plateau region. The minimum mean reading was reported at Key West, Fla.

The mean pressure was above the normal in all regions, ex-

I have never attempted to disguise the difficulties inherent in this kind of observations. I had previously expected in China to be able to elevate the windmill on a tower 33 meters high, made for the purpose. Once established at Jersey, I did not rest until I had erected another tower, both higher and more slender, in order to continue my researches on the vertical component of the wind.

I may say that all the precautions enumerated by Professor Marvin have been taken in order to insure the verticality of the principal support, which is a strong tube of steel, ten centimeters in diameter, absolutely inflexible, and also the verticality of the axis of the windmill on its horizontal arm. As regards the latter, I have not been able to do away with an inclination of the axis of eight minutes, but all the hourly velocities have received a corresponding correction.

The movements of this windmill are very complex and curious. I think that one should be very cautious in attributing them to causes other than movements of atmospheric currents. It is a phenomenon that one must observe for himself and under the best conditions. Unfortunately no observatory has been willing, like myself, to undergo the considerable expense of a suitable installation.

Allow me to add some reflections on the subject of your correspondence with Professor Stupart in the MONTHLY WEATHER REVIEW for March, 1904; the primary and principal cause of cold waves. Already, in 1898, on the occasion of the cold wave of November 26, discussed at length and with charts in the MONTHLY WEATHER REVIEW, I was convinced that these cold waves of the United States proceed from the same cause as our cold waves in Europe. Both accompany anticyclones, or follow cyclones, or more often still appear between two centers of low pressure. Professor Stupart is no longer willing to regard radiation as a sufficient cause for such cold, and he now repeats what I said in 1886 and what I have not ceased to say since: some other cause than radiation is needed to explain this phenomenon. In my belief, the only truly efficacious, truly adequate cause of these great cold waves is the dispersion of aerial masses, which descend in the high pressures and expand over two gradients in the directions of the two centers of depression. Consider the chart of November 26, 1898. You will see there a complete sheet of winds from the southeast and south, whose direction is toward Montana, where the temperature is 20° F. at the center of a low; and another sheet of winds from the northwest, whose direction is toward another low over Lake Erie, with a temperature of 28° F. The dividing line between these two systems of winds is over an area of high pressure with a temperature of about —10° F. Impossible that such a fall in temperature should be due to radiation, especially that the fall should have been greater in the wind from the south, to which one attributes a temperature naturally higher than in the wind from the north.

The cold waves, therefore, are no more confined to polar currents than are the warm waves to equatorial currents. Cold will always be found associated with currents of dispersion, and heat with currents of concentration.

If to this idea of horizontal winds of dispersion and concentration is added another conception, to which I gave equal emphasis in 1886, the conception of two superposed eddies forming together the cyclone, and two others forming together the anticyclone, we may thus most simply explain the distribution, so curious, of temperature along the axes of cyclones and anticyclones, such as has been revealed to us by observations on mountains, and more recently and more completely by balloons.

CORRIGENDA.

MONTHLY WEATHER REVIEW for August, 1904, p. 371, column 1, table, insert "p. m." after the figures expressing time: eighth line below table, strike out "counting from 0" at midnight to 24 hours."

cept the Florida Peninsula, extreme northern California, western Oregon, and southern and western Washington.

The greatest excess in mean pressure occurred in portions of the Plateau and slope regions, and over the central districts from the middle slope region eastward to the Atlantic Ocean over southern Pennsylvania and to eastern North Carolina. The greatest deficiency in mean pressure occurred over southern Florida.

The mean pressure decreased from that of September, 1904, over southeastern North Carolina, eastern South Carolina, the southern portions of Georgia, Alabama, and Mississippi, southeastern Louisiana, Florida, eastern New York, New England, western Washington, west-central Minnesota, eastern and northern South Dakota, and the southern portion of North Dakota. In all other districts there was an increase.